

Analysis of the physical properties and chemical properties of elements.

- A. Flame Test of Na^+ , K^+ , Li^+ , Sr^{+2} , Ca^{+2} , Ba^{+2} , Cu^{+2} : When many types of elements are exposed to energy they produce an emission spectrum (produce or give off light). You will test the listed cations of 1A, 2A metals and one transition metal by exposing each sample to a flame. The light given off is a physical property of the element.

You are provided with paper cups that contain the salts of group 1A and 2A cations and one transition metal. At the station you also have coffee stir sticks, a beaker with distilled water, and a Bunsen burner. Take a stir stick and wet the tip in the beaker. Then touch the tip of the stick to the salt of your choice. Carefully wave the stick through the flame. Note the color of the flame in the table below.

Na	K	Li	Sr	Ca	Ba	B	Cu

B. Elements also have chemical properties. A chemical property describes how a particular element reacts to form a new compound with different reagents.

1. Obtain Li and Na metal from Dr. Pete. Test each sample as directed by the instructor using water as the reactant. Write down your observations. Make sure to test the resulting solution with red litmus paper and describe the results in your notebook. What color did the litmus turn? What is the significance of the color.

2. Repeat #1 with Ca metal found in the labeled cup on the bench.

3. Are the Group 1A and 2A elements reactive? Why are the 1A elements called alkali metals and the 2A elements called alkaline metals?

C. Analyze the metals: Zn, Cu, Fe, and Al elements for their reactivity with a 3M solution of HCl. Place some powder in a clean test tube. Wash any residue down the inner wall of the tube using the 3M HCl. Gently heat the metal/acid mixture over a flame. Observe any reaction. Make sure to agitate the tube. Look for bubbles, etc.

Test the gases bubbling out of solution for the presence of hydrogen. Carefully insert a **Flaming Splint** into the tube. If the gas ignites—it should make a plooping or popping sound—this means the gas is hydrogen (H_2).

Which two metals are most reactive with HCl? Which two metals are least reactive with HCl?